

Chapter II – Freight Transportation Overview



Freight transportation is a major U.S. and worldwide industry

- Worldwide, industrialized and developing nations depend on efficient freight transportation for internal distribution of goods and for growing trade with the rest of the world. Efficient transportation is a critical ingredient in globalization of the world's economy.
 - An estimated 10% of the working population is involved in ordering, handling, and moving freight shipments.
 - Total 1998 freight transportation revenues were about \$524 billion.
 - Freight transportation accounted for the equivalent of 6.2% of U.S. Gross Domestic Product (GDP) in 1998.
- Efficient freight transportation is critical to a healthy economy
 - Freight transportation typically accounts for 12-15% of the value of finished products
 - Manufacturers and other shippers rely on efficient freight transportation to obtain raw materials and to compete in distant markets
 - Wholesalers, retailers, and other receivers need efficient freight transportation to obtain and distribute goods economically, on time, and in proper condition
 - Consumers rely on efficient freight transportation for everything from the necessities of life to the purest luxuries
 - The SCAG Region needs an efficient freight transportation system to compete in North American and global markets

Freight Transportation demand is derived

- Demand for freight transportation is derived from the requirement of shippers and receivers to move goods from where they are to where they are needed
 - No one buys or supplies freight transportation except to fulfill a definite need
 - Those who supply freight transportation cannot create a demand for it
 - Those who demand freight transportation define their requirements for speed, reliability, cost, and other characteristics.

Freight transportation participants

- The direct customer of a freight carrier may be a shipper, a consignee, a beneficial owner, an intermediary, or even another carrier.
 - Shippers (typically manufacturers or other producers and distributors) prepare freight for transport and originate the movement.
 - Consignees or receivers (typically customers of the shippers) receive the freight at the destination.
 - The shipper or receiver may or may not actually own the goods. The party who owns the goods being shipped is the beneficial owner.
 - Carriers (transportation service providers) are firms that move freight by one or more mode.
 - Fleet operators operate (and may also own and maintain) the vehicles (usually trucks) used to move freight.
 - Fleet operators include both commercial carriers (who transport freight for customers as their primary business) and private operators (who transport their own freight, usually for final delivery to customers).
 - Intermediaries or third parties (including freight forwarders, shipper's agents, and brokers) arrange transportation on behalf of shippers or receivers.

Freight transportation modes

- Freight transportation is often categorized by mode:
 - Truck (motor carriers or truckers)
 - Rail (railroads)
 - Marine (ocean or inland waterway)
 - Air (airlines)
 - Pipeline (private or commercial pipelines)
 - Intermodal (using more than one of these modes)
- This study is focused on truck, rail, and intermodal freight transportation
 - Truck, Rail, and Marine are “surface” modes and carry the vast majority of freight of concern to the general public.
 - Intermodal, in this study, includes rail/truck movements and the rail and truck portions of marine/rail/truck movements.
 - Air carriers primarily handle high-priority, lightweight, or valuable freight in express or air cargo service, and are not analyzed.
 - Pipelines handle liquid commodities in bulk, mostly petroleum and petroleum products, and are also not analyzed.
 - Marine carriers handle waterborne shipments, and are only mentioned in connection with rail and truck modes.

The surface modes have very different industry characteristics

Exhibit 3: Surface Transport Modes

<i>Mode</i>	<i>Estimated 1997 Size (Billions)</i>	<i>Industry Concentration</i>	<i>Size of Largest Companies (Billions)</i>	<i>Typical Market Area</i>	<i>Economic Regulation</i>
<i>Intermodal</i>	\$10	Moderate- Increasing	\$2	National	Deregulated
<i>Rail Carload</i>	\$29	High	\$5	Regional	Partially Deregulated
<i>Trucking</i>	\$480				
<i>Truckload</i>	\$200	Low-Increasing	\$2.7	National, Regional	Deregulated
<i>LTL & Parcel</i>	\$20	High	\$2.5	National, Regional	Deregulated
<i>Local Trucking</i>	\$140	Very Low	\$0.1	Local	Deregulated
<i>Private Trucking</i>	\$120	Very Low	\$0.4	Local, Regional	Unregulated
<i>Domestic Water</i>	\$8	High	\$0.5	Coastal/Lake	Mixed

Source: Transportation in America 1998; The Tioga Group

Domestic Intercity Ton Miles 1998

The Eno Foundation recently reported that in 1998, truck ton-miles advanced 1.1% from 1997 and 45% from 1989.

Since trucks typically handle low weight, higher value manufactured goods over shorter distances than rail, trucking's share of ton-miles are much lower than its percentages for revenue, tonnage and value of shipments.

According to Commodity Flow survey in 1997. The average length of haul for all trucks was 144 miles compared with 769 for railroads.

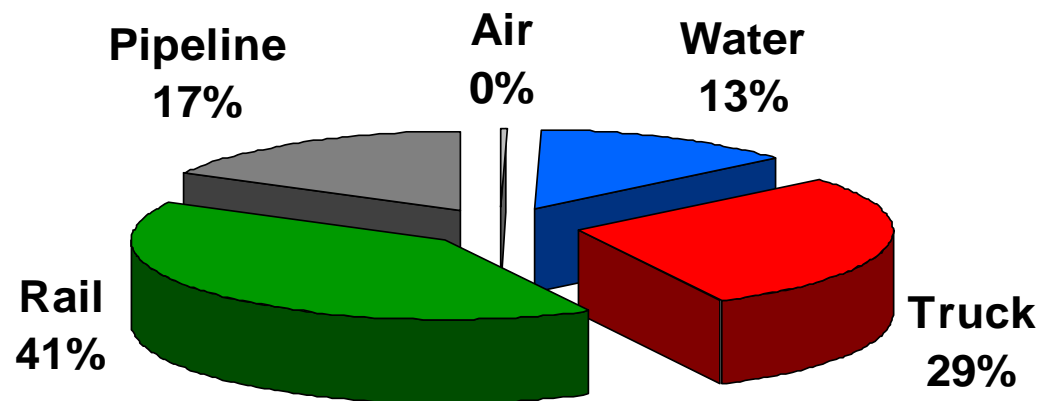


Exhibit 4: Domestic Ton-Miles

How does the customer decide between modes?

Supply chain decision: match characteristics with need

Interplant shipments or Customer Delivery
inbound raw material: multiple modes, ship,
rail, pipeline, truck to factory

Manufacturing to Distribution Centers - o/b
truck and rail

DC to stores - o/b truck and LTL

Air and small package - alternatives for small
or urgent shipments unanticipated

Product Characteristics

Bulk vs. packaged

Liquid

Refrigerated

Fragility, packing requirements

Value of product

Transit time

Next day delivery

Line shut down loads

Inventory shortage or Stock out situations

End of month sales promotion

Volume purchase

Inventory replenishment movement or Just In
Time

Return merchandise or reverse logistics

Control

When your job is dependant upon the
movement of goods

Single accountability

Clear claims responsibility

High visibility,

Type of communication often available

Large-scale Influences on Modal Choice

Near Term – Change in Years

Changing modal characteristics – cost factors, service type & quality, reliability.

Access – rail access, freeway access, intermodal ramps, transload points.

Logistics practices – shipment size, inventory preferences, sourcing, distribution patterns.

Long Term – Change in Decades

Geography – size, location, and distances between major freight markets and sources.

Commodity mix – regional production and consumption patterns and balance.

Goods in transit – the SCAG region's role as an international gateway and physical distribution center.

Basic modal characteristics – technology, vehicle type, freight capabilities.

Regulation and Competition

- The freight transportation industry is largely deregulated and highly competitive
 - For most of the 20th century, freight transportation was under close federal regulation.
 - Beginning in 1980 Congress dramatically reduced economic regulation of freight transportation in the U.S.
 - Freed from the restraints of regulation, transportation service providers have competed vigorously to improve efficiency.
 - Shippers attempt to maximize their choices and to select the best mode or combination of modes for each shipment.
 - Shippers can easily switch between individual service providers, and do so regularly.
- Increased competition has encouraged innovation and emergence of new, more efficient transportation service providers
 - Many firms could not compete under the increased competition that resulted from deregulation
 - Over time however, competitive pressure has resulted in the emergence of new, efficient, and more specialized transportation service providers
 - These firms are often categorized as follows:
 - Asset-based Service Providers are those who own vehicles, terminals, and other physical assets
 - Non-asset-based Service Providers are those who own few if any physical assets; they typically broker or sub-contract vehicle and terminal operations and emphasize managerial assistance
 - Mixed Service Providers may own some assets but contract for services in other areas

Shipment Value by Mode

- Every five years the Bureau of Transportation Statistics and the U. S. Census Bureau team up to conduct the Commodity Flow Survey. The 1999 edition of “Trends” reported preliminary data from the 1997 Commodity Flow Survey.
- Trucking hauled nearly \$5 trillion worth of merchandise , an increase of 13.1% from 1993

Exhibit 5: Shipment Value by Mode

Mode	Value	Percent
Parcel, USPS Courier	\$ 855,897	12.3%
Private Truck	\$2,036,528	29.3%
For- Hire Truck	\$2,901,345	41.8%
Air	\$ 229,062	3.3%
Rail	\$ 319,629	4.6%
Pipeline	\$ 113,497	1.6%
Water	\$ 75,840	1.1%
Truck and Rail	\$ 75,695	1.1%
Other unknown modes	\$ 6,943,988	4.0%

Freight Data Issues

- There is no single public source of consolidated, detailed freight data across multiple modes
 - Data in the possession of individual carriers and customers are confidential, and virtually impossible to acquire or assemble for the region as a whole.
 - Preliminary Caltrans ITMS data are just now becoming available, with freight modules to be officially released in November 2002
- Accordingly, the project team acquired and compiled the following sources:
 - 1999 Carload Waybill Sample (rail)
 - 1997 Commodity Flow Survey (all modes)
 - 2000 (base year) SCAG Heavy Duty Truck Model
- These data sources do not match in the details of methodology, coverage, definitions, or classification. The analysis conducted for this project is intended, therefore, to inform and support broad policy decisions. Application of policy to individual movements or flows would require additional, more complete data, and can only be used for overall volumes and trends

Southern California Outbound Freight Destinations

- **80%** of the tonnage originating in Southern California stays within the region.
- **90%** of the tonnage originating in Southern California stays within the state.
- Interstate traffic from Southern California is concentrated in a few Western states.

Exhibit 6: Outbound Shipments

1997 S. Calif Outbound Shipments		
State	Tons (000)	Tons %
California	326,647	90%
Arizona	7,289	2%
Texas	4,767	1%
Nevada	4,317	1%
Washington	2,687	1%
All Others	16,205	4%
Total	362,517	100%
Source: 1997 CFS		

Southern California Inbound Freight Origins

- **77%** of the tonnage received in Southern California comes from within the region.
- **83%** of the tonnage received in Southern California comes from within the state.
- Interstate traffic to Southern California mostly originates in a few Western states.

Exhibit 7: Inbound Shipments

1997 S. Calif Inbound Shipments		
State	Tons (000)	Tons %
California	315,420	83%
Texas	10,276	3%
Utah	7,259	2%
Washington	5,590	1%
Oregon	3,903	1%
All Others	34,529	9%
Total	379,430	100%
Source: 1997 CFS		

Major Commodities Shipped

- Major commodities shipped from Southern California include petroleum and petrochemicals, minerals, metals & machinery, etc.
- The largest rail tonnage shares are in metals & machinery, grain products, and chemicals.

Exhibit 8: Major Commodities

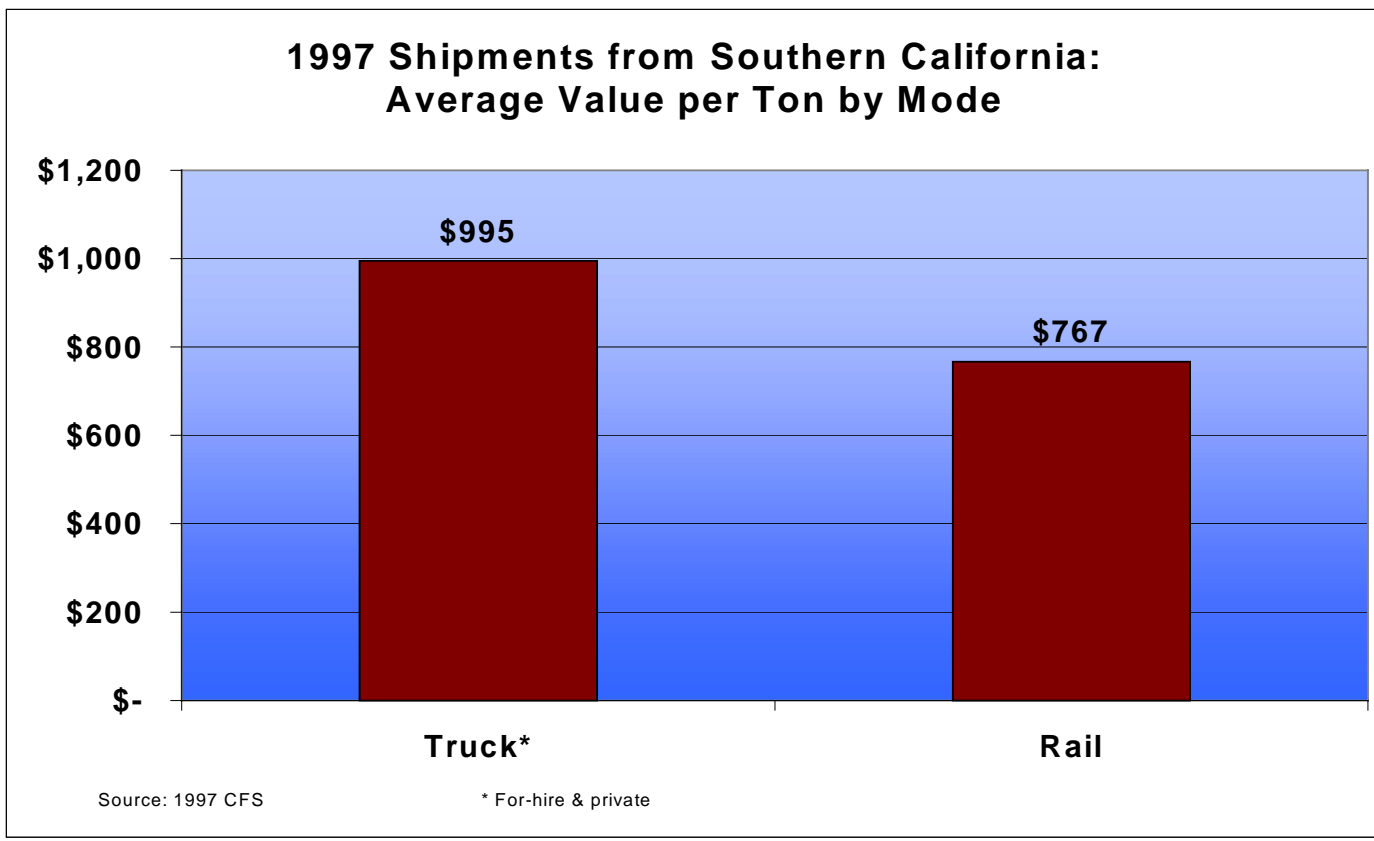
Commodity Group	Tons (000)	Truck Share	Rail Share	Other Share
Coal and petroleum products	111,922	55%	0%	44%
Stone, Nonmetallic minerals, and metallic ores	73,906	99%	0%	1%
Base metal and machinery	50,420	89%	2%	9%
Grains, alcohol, and tobacco products	32,992	97%	2%	1%
Furniture and miscellaneous manufactured products	32,736	83%	0%	17%
Wood products, and textiles and leather	23,844	92%	1%	7%
Agricultural products and fish	18,977	96%	1%	4%
Pharmaceutical and chemical products	9,460	89%	3%	7%
Electronics, motorized vehicles, and precision instruments	5,658	81%	2%	17%
Total	362,517	81%	1%	19%

Southern California Freight Value by Mode

Trucks carry the higher-value freight.

Intermodal can also compete for valuable freight.

Exhibit 9: Outbound Shipment Value

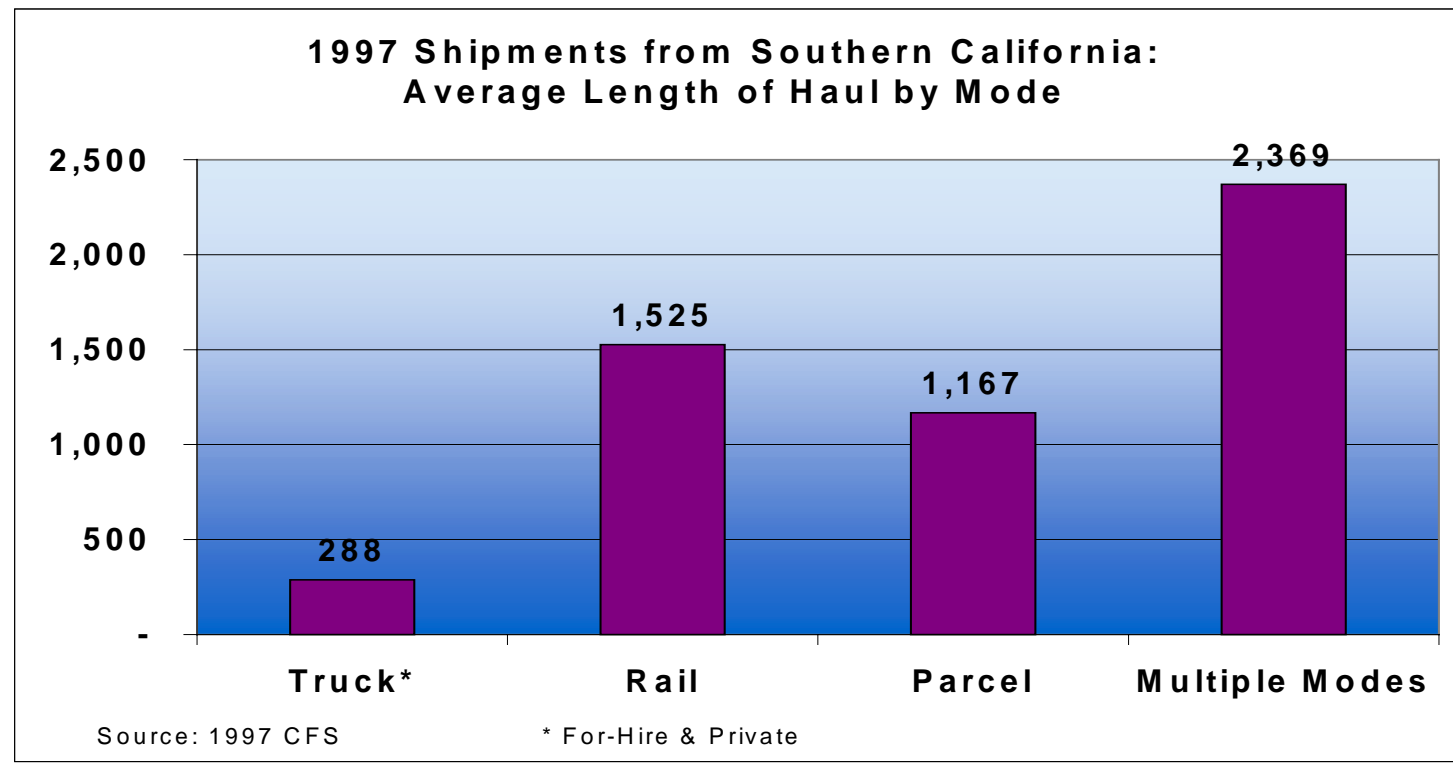


Southern California Length of Haul by Mode

Trucking is a regional & local business, with a short average length of haul.

Rail and intermodal are primarily long-haul modes.

Exhibit 10: Outbound Length of Haul

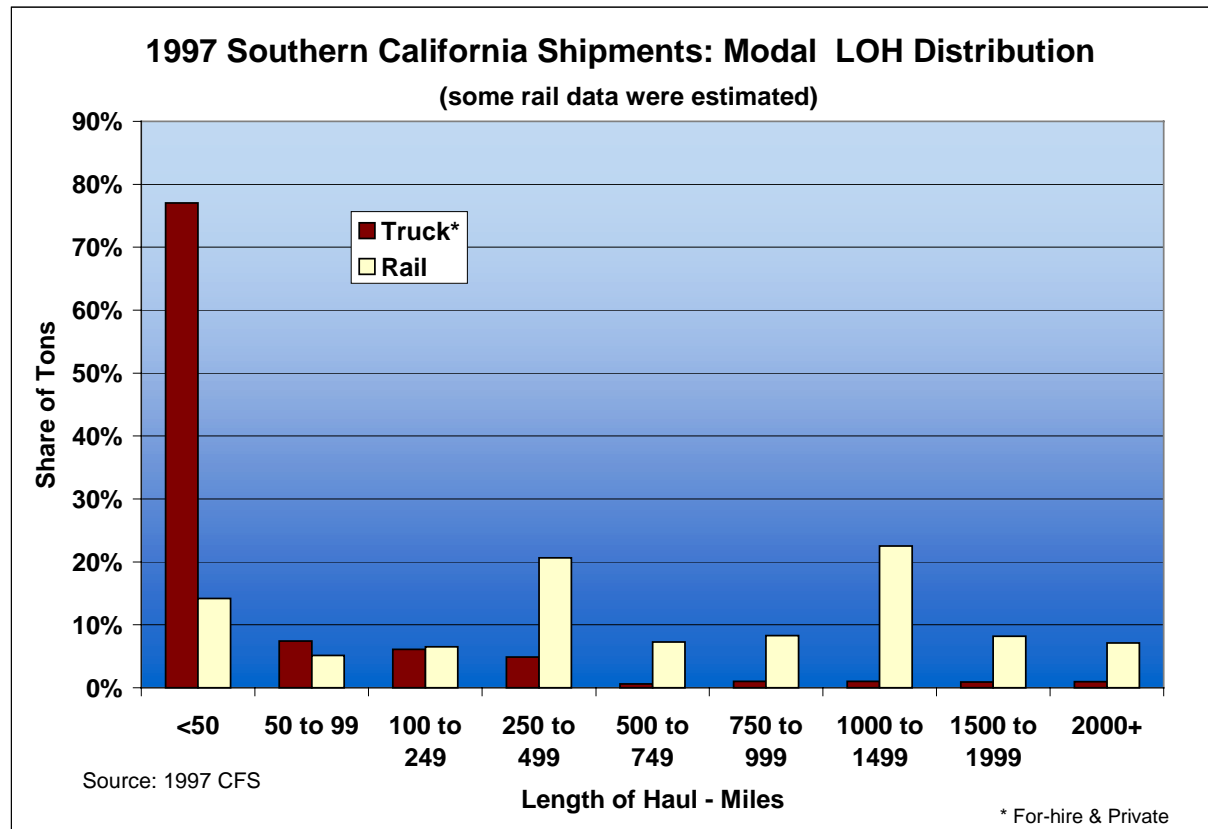


Southern California Modal Length of Haul Distribution

Over 75% of the truck tonnage moves less than 50 miles.

Rail movements include both short and long hauls.

Exhibit 11: Length of Haul Distribution



Southern California Modal Shares

Exhibit 12: Southern California Modal Shares

1997 Shipments from S. California (Los Angeles-Riverside-Orange Co.)					
Mode	Tons (000)	Tons %	Ton-miles (mil)	Ton-miles %	Avg. miles
Truck	294,502	81%	38,437	63%	288
Rail	2,904	1%	2,628	4%	1,525
Parcel, US Postal Service or courier	1,887	1%	2,473	4%	1,167
Other multiple modes	984	0%	1,968	3%	2,369
All Other	62,240	17%	15,096	25%	NA
Total	362,517	100%	60,602	100%	NA

Source: 1997 CFS

1997 Shipments to S. California (Los Angeles-Riverside-Orange Co.)					
Mode	Tons (000)	Tons %	Ton-miles (mil)	Ton-miles %	Avg. miles
Truck	285,952	75%	57,462	46%	221
Rail	24,058	6%	35,837	28%	1,756
Parcel, US Postal Service or courier	1,075	0%	1,108	1%	1,235
Other multiple modes	6,923	2%	19,647	16%	2,183
All Other	61,422	16%	12,066	10%	NA
Total	379,430	100%	126,121	100%	740

Source: 1997 CFS